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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
08 702,718	03 19 1997	BERND MULLER-ROBER	AGREVO-1	7038

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EXAMINER

BUI, PHUONG T

ART UNIT	PAPER NUMBER
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1638

DATE MAILED: 01/28/2003

36

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

08/702,718

Applicant(s)

Muller-Rober et al.

Examiner

Phuong Bui

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Nov 12, 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 71, 74-83, and 100-120 is/are pending in the application.
- 4a) Of the above, claim(s) 78, 102, 103, 106, 107, 109, 110, 113, and 114 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 71, 74-76, 79-83, 100, 101, 104, 105, 108, 111, 112, and 115-120 is/are rejected.
- 7) ☒ Claim(s) 77 is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

*See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 6) ☐ Other: _____

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DETAILED ACTION

1. The Office acknowledges the receipt of the Request for Continuing Prosecution Application and Preliminary Amendment H, Paper Nos. 35 and 36, filed November 12, 2002. Claims 71, 74-83 and 100-120 are pending. Claims 78, 102-103, 106-107, 109-110 and 113-114 are nonelected. Claims 71, 74-77, 79-83, 100, 101, 104-105, 108, 111-112 and 115-120 to the extent of species VI (citrate synthase of *S. tuberosum* or SEQ ID NO:1) are examined in the instant application. This action is made FINAL.

Drawings

2. In accordance with current Office policy, formal drawings are required in response to this Office Action. The filing of formal drawings is no longer held in abeyance pending indication of allowable subject matter. Applicant should note that the failure to comply with this requirement in a timely manner may result in delays in the issuance of any patent granted from this application and may also result in abandonment of this application.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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4. Claims 71, 74-76, 79-85, 88, 91, 94-101, 104-105, 108, 111-112, 115-120 remain rejected under 35 U.S.C. 103(a) as being unpatentable over Unger et al. (Plant Molecular Biology 13: 411-418, 1989) in view of Shewmaker et al (U.S. Patent 5,107,065) for reasons set forth in thof record.

The claims recite a DNA molecule, vector, transformed bacterial or plant cell, transgenic plant and seed each having a promoter functional in plants and a DNA sequence at least 15 basepairs in length from a citrate synthase coding region fused to the promoter in antisense orientation. The claims further recite methods for reducing citrate synthase production and inhibiting flower formation using the DNA molecule.

Unger et al. teaches a citrate synthase protein and gene therefor from *Arabidopsis thaliana*. As shown in the attached sequence search report, the enzyme of Unger has over 65% structural match to SEQ ID No: 2. Moreover, the sequence of the DNA encoding this enzyme has nearly 30% overall structural identity to SEQ ID No: 1, including stretches of at least 15 basepairs that exhibit 100% identity. Unger et al. does not teach fusing the citrate synthase gene or a portion thereof in antisense relation to a plant functional promoter.

Shewmaker et al. teaches regulation of expression in plant cells is achieved by integrating into the plant cell a DNA sequence in complementary or antisense orientation (col. 1, lines 58-62) and that transcription of such DNA results in anti-sense mRNA that will reduce the functioning of the naturally existing RNA. Shewmaker also teaches that such reduction is particularly useful in modulating phenotypic properties of a plant (col. 2, lines 18-20).

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Modulation of metabolic pathways and their enzymes is specifically mentioned (col. 2, lines 25-32). Shewmaker discusses the minimum requirements for successful use of antisense mRNA including a minimum sequence length of 15 basepairs. The DNA sequence may be fused to a plant functional promoter (col. 3, lines 7-44) and may be introduced into a plant by a variety of ways including a transformed bacterial host (col. 3, lines 61-68). The use of antisense mRNA may be employed in any plant including grain plants, fruit plants, vegetable plants, ornamental plants, tubers, beet, tobacco, potato, manioc, rapeseed and sugar cane (col. 4, lines 1-14). Inhibition of flowering may be the phenotypic property desired (col. 4, lines 38-39). Finally, Shewmaker teaches that alteration of a component content in plants can be modulated by using antisense mRNA to an enzyme involved in the metabolic pathway for that component (col. 4, lines 43-68).

It would have been obvious to one of ordinary skill in the art to have used the DNA sequence for the citrate synthase gene of Unger following the teachings of Shewmaker to produce a DNA construct comprising a portion of at least 15 basepairs from or at least 65% identity to a DNA sequence encoding Unger's citrate synthase fused to a plant functional promoter. One skilled in the art would have motivated to have done so with a reasonable expectation of success because Unger teaches the importance of the citrate synthase for studying the balance of energy-generating processes uniquely available to photosynthetic cells. Further, this enzyme was well known for both its catalytic activity and metabolic pathway. Accordingly, given that Shewmaker teaches that antisense technology is especially useful for modulating metabolic pathways for

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modulating phenotypic properties in plants, one would have expected that use of antisense mRNA would inhibit citrate synthase with a reasonable expectation of success. Although Unger does not teach the relationship between citrate synthase and flower formation, one skilled in the art would have found it obvious to use antisense mRNA for citrate synthase for other reasons as stated above. It would further have been obvious to have transformed a bacterial cell with the antisense construct where the bacterial cell is later used to transform a plant cell as suggested by Shewmaker.

As previously stated, the gene encoding citrate synthase was known in the prior art, as taught by Unger. Shewmaker teaches that production of antisense (including a minimum sequence length of 15 base pairs) to any known gene to regulate expression of that gene was within the ordinary skill in the art for inhibiting gene function. Shewmaker also teaches numerous instances where antisense constructs would be desirable, e.g., in modulating phenotypic properties of a plant, metabolic pathways and their enzymes, and inhibiting flower formation. Accordingly, to down-regulate the expression of a known gene such as the gene encoding citrate synthase for any of the reasons set forth by Shewmaker by utilizing the antisense construct as taught by Shewmaker would have been obvious at the time the invention was made. Accordingly, one skilled in the art would have been motivated to do so with a reasonable expectation of success.

Conclusion

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5. Claim 77 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. No claim is allowed.

7. This is a CPA of applicant's earlier Application No. 08/702,718. All claims are drawn to the same invention claimed in the earlier application and could have been finally rejected on the grounds and art of record in the next Office action if they had been entered in the earlier application. Accordingly, **THIS ACTION IS MADE FINAL** even though it is a first action in this case. See MPEP § 706.07(b). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no, however, event will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.


8. Papers relating to this application may be submitted to Technology Sector 1 by facsimile transmission. Papers should be faxed to Crystal Mall 1, Art Unit 1638, using fax number (703) 308-4242. All Technology Sector 1 fax machines are available to receive transmissions 24 hrs/day, 7 days/wk. Please note that the faxing of such papers must conform with the Notice published in the Official Gazette, 1096 OG 30, (November 15, 1989).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phuong Bui whose telephone number is (703) 305-1996. The Examiner can normally be reached Monday-Friday from 6:30 AM - 4:00 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Paula Hutzell, can be reached at (703) 308-4310.

Any inquiry of a general nature or relating to the status of this application should be directed to the receptionist whose telephone number is (703) 308-0196.

Phuong Bui
Primary Examiner


PHUONG T. BUI
PRIMARY EXAMINER